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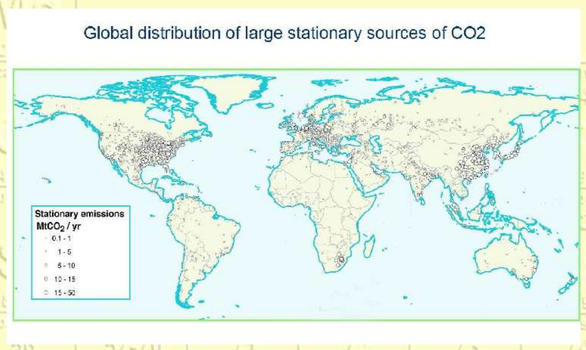
Arrhenius ja va predir el canvi climàtic el 1896*

Using very strong language, a United Nations panel says global warming is unequivocal, and human activities are the major factor responsible for the temperature rise.

The report, released in Paris on Feb. 2, concludes that there is a greater than 90% certainty that Earth's temperature rise since 1950 has been caused by human greenhouse gas emissions and land-use changes. Using best estimates, global average temperatures will rise 1.8 to 4.0 °C by 2100 relative to 2000. In contrast, the change from the 19th to the 20th century was 0.76 °C. Even if atmospheric levels of greenhouse gases are held constant at current levels, Earth will warm about 0.1 °C over each of the next few decades.

The new and fourth assessment, by the UN Intergovernmental Panel on Climate Change (IPCC), relies on a larger number of climate models of increasing complexity and realism than the previous assessment. According to the report, sea level will rise between 0.18 and 0.57 meters from thermal expansion alone by 2100. This increase does not include the effects of uncertainties in the carbon cycle feedbacks and the full effects of rapid dynamical changes in ice flow from ice sheets because these effects cannot yet be modeled.



*_Phil. Mag. S. 5_, **1896**, _41_, 237, accessible a _http://www.globalwarmingart.com/images/1/18/Arrhenius.pdf_ . Podeu trobar més informació sobre el canvi climàtic a la pàgina web del Intergovernmental Panel on Climatic Change, _http://www.ipcc.ch/_

La Química reescriu la colonització d'Amèrica

Chemical analysis of metallurgical artifacts from La Isabela—the settlement Christopher Columbus founded on his second trip to the New World in 1494—is challenging the long-held notion that the site is where Europeans first mined and processed precious metals in the New World. A recent lead isotope analysis of La Isabela artifacts reveals that the settlers were not, as archaeologists thought, extracting silver from Caribbean ores but were trying to pull the metal out of materials they'd brought from Spain (A. M. Thibodeau *et al.*; *Proc. Natl. Acad. Sci. USA* **2007**, *104*, 3663).

La Isabela has a legacy of disappointment. When Columbus returned to Spain in 1493 from his first expedition to the Americas, he spoke exuberantly of a New World glimmering with golden treasure. His tales convinced Spain's King Ferdinand and Queen Isabella to finance a much larger second expedition. As many as 1,500 settlers joined Columbus, no doubt tempted by the promise of riches. These starry-eyed adventurers established La Isabela, the first European town in the New World, on the northern shore of what is now the Dominican Republic. They did not, however, find any precious-metal ores there. Instead, the settlers found hunger, disease, hurricanes, mutiny, and conflicts with the local Taíno natives. By 1498, La Isabela had been abandoned.

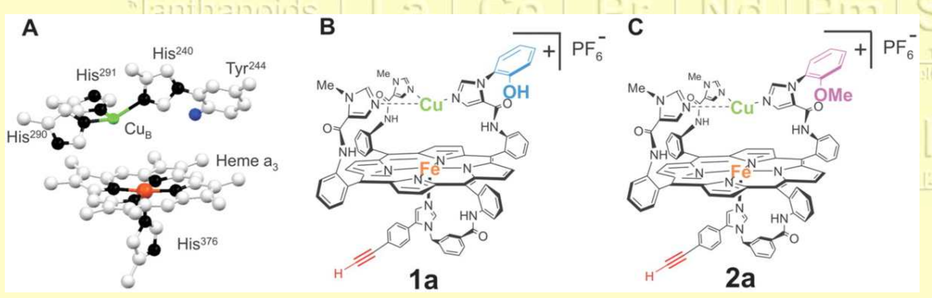
Un compost de coordinació reprodueix la respiració celular

A new model of the active site of a key enzyme in cellular respiration allows scientists to study the enzyme under conditions where the flow of electrons is the limiting step, as it is in the natural enzyme (J.P. Collman *et al.*, *Science* **2007**, *315*, 1565).

Cytochrome c oxidase catalyzes the four-electron reduction of O_2 to H_2O during the final stage of respiration. This reduction must happen without releasing partially reduced oxygen species, which are toxic. How the enzyme accomplishes this is poorly understood, because scientists haven't been able to study the enzyme under electron-limited conditions that might be expected to lead to partial reductions.

The researchers built a biologically relevant model system that includes three redox sites: a myoglobin-like heme, copper suspended among three imidazoles about 5 Å above the heme, and a phenol group covalently attached to one of the copper-ligating imidazoles.

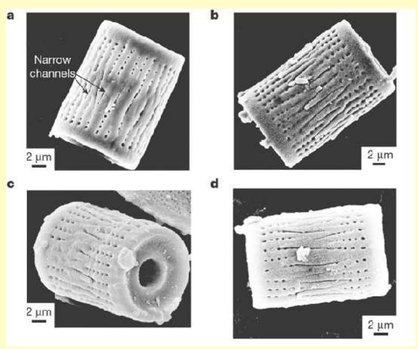
The anchored model system answers some elusive questions about cytochrome c oxidase's mechanism.



Materials electrònics a partir d'algues

The ornate glass cages that diatoms call home are getting a high-tech makeover, courtesy of chemistry. Materials scientists have developed a way to convert the unicellular algae's intricate silica exoskeletons into silicon without destroying their architectural finery (K. H. Sandhage *et al.*, *Nature* **2007**, *446*, 172). The resulting rococo microstructures could find use in sensing, optical, and electronic applications.

To strip the oxygen atoms out of the silica structures, Sandhage's group seals the exoskeletons in a steel ampoule along with some magnesium granules and then heats up the apparatus to 650 ºC. That's hot enough to generate magnesium gas, which reduces the silica to elemental silicon. It's not so hot, however, that the silicon becomes volatile, so the glassy cage's original shape remains intact. A bath in hydrochloric acid removes any oxidized magnesium from the structure, leaving only silicon behind.



Els premis estimulen la investigació química

Abul Hussam of George Mason University, Fairfax, Va., has won the $1 million Grainger Challenge Prize for Sustainability for designing a simple, inexpensive system for filtering naturally occurring arsenic from drinking water. Hussam's design, which uses buckets of river sand, pieces of cast iron, and charcoal, is already preventing serious health problems for thousands of people in his native country of Bangladesh.

The National Academy of Engineering (NAE) established the Grainger Prize in February 2005 to accelerate U.S. development of technologies for improving living standards throughout the world (*Chem. Eng. News*, Feb. 7, 2005, page 10). The prize is sponsored by the Grainger Foundation. The challenge for the first contest was the design of an affordable system to reduce arsenic levels in drinking water to below 50 µg/L, which is the standard in most developing countries.

On the other hand, in an effort to speed the commercialization of new processes for the direct conversion of methane into olefins and olefin precursors, Dow Chemical will offer research grants of up to $6 million over three years to any investigator or investigating consortium that can offer a viable solution to this long-vexing problem.

Dow is asking those interested to submit a two-page nonconfidential proposal through a special website, www.dowmethane.com, by May 31. Dow scientists will review proposals and may ask for additional information. Then, subject to the execution of a research agreement, Dow hopes to make one or more awards in the fall.

Breus

• **Superman en perill?** Lex Luthor estarà content: s'ha descobert a Sèrbia la *jaderita*, un mineral que té la mateixa composició que la kriptonita, $LiNaSiB_3O_7(OH)$.

• La revista *Chemical Reviews*, de la *American Chemical Society*, incorpora els *reviews* permanents, amb una actualització continuada dels continguts (J. Michl. *et al.*, *Chem. Rev.* **2007**, *107*, 1).

• Els principals fabricants informàtics (IBM, Intel, AMD) han preparat nous transistors que incorporen hafni i són un 30% més petits que els actuals, que permetran construir una nova generació de microprocessadors (*Chem. Eng. News*, 5 feb. 2007, p. 9).

L'element número **33**, **arsènic,** és conegut des de l'antiguitat. Es creu que Sant Albert el Gran el va preparar el 1250 per reducció de l'orpiment (As_2S_3). El nom prové del mot grec αρσενικον, que vol dir *orpiment groc*.